California State University Long Beach

Physics and Astronomy

2014-2015 Newsletter #33

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http://www.csulb.edu/depts/physics/

Dr. Claudia Ojeda-Aristizabal

Physics & Astronomy Professor and Department Chair Dr. Chuhee Kwon

Inside This Issue:

The Year in Review

By Dr. Chuhee Kwon, Chair
Department of Physics and Astronomy

The Department of Physics and Astronomy has had a very successful year.

First, I am proud to introduce our new tenure-track faculty member, Dr. Claudia Ojeda-Aristizabal. An experimental physicist, she earned her Ph.D. in Condensed Matter Physics from the Universite Paris-sud IX in Orsay, France, followed by four years of postdoctoral training, the last two at the UC Berkeley, working in the field of quantum phenomena in nanoscale layered structures. She is a great addition to our department, offering our majors research opportunities in this exciting new field.

Second, we are pleased to report that Academic Affairs approved the Master of Science degree program in Professional Physics, effective Fall 2016. This degree will address the need for a more business-oriented degree, especially for those students who are part of or seek to enter industry. We have been working towards offering this degree for several years now.

Third, the Department is particularly honored to be selected to receive the Award for Improving Undergraduate Physics Education from the American Physical Society, the only national award granted by the professional society for physics recognizing both the high quality of an undergraduate program, and the potential for the program to help improve physics education across the country. We are recognized for increasing the number of degrees awarded, and for implementing innovative practices.

This award is a direct result of both the hard work of the faculty, staff and students in the department, and critical support offered through the HVDI (Highly Valued Degree Initiative) project and approved at the highest levels of academic affairs. The Learning Assistant project (Funded by both the Julius Sumner Miller Foundation and the HVDI project for the last three years) began as a collaboration between the Department of Physics and Astronomy and the Department of Science Education, and is aimed at increasing the overall number of physics majors as well as recruiting them to be middle-through-High School teachers. We have been phenomenally successful in both regards, as the award committee noted.

In 2014, according to the American Institute of Physics, the CSULB Physics and Astronomy Department produced a total of 35 physics degrees (9 URM = under represented

minorities), the second largest among 56 master-granting physics departments in the US.

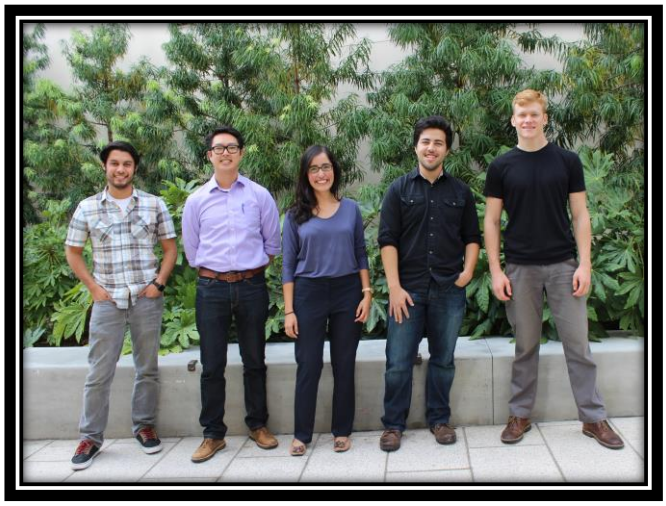
Fourth, we are also very proud of Mike Peterson's award from the National Science Foundation for his proposal, "RUI: Numerical Studies of Topological Ordered Phases in Realistic Models". This award supports theoretical and computational research and education on new electronic states of matter in two-dimensions. We congratulate him on this great achievement.

Finally, in October of 2015 we submitted our department Self-Study in which we stated, "In summary, the Department of Physics and Astronomy at CSULB has made significant, research-based and quantitatively assessed improvements throughout their program and achieved a transformative increase in the number of physics degrees awarded at the University, particularly to URM students, along with improved education of not only their majors but all STEM (Science, Technology, Engineering, Math) students." We are looking forward to continued success and new achievements, and I would like to thank everyone in the Department for their contributions.

Learning Assistants

Above is a picture of some of our Learning Assistants with their mentor, Dr. Galen Pickett (far right). These Learning Assistants help with tutoring in our tutoring room and also in the labs. It is a great way for the students to see what it is like to teach, and for them to become proficient with problem-solving and various teaching methods. In addition to the experience that the tutors gain, these are paid positions, which help students financially. Below you can see some of the tutors helping out in the tutoring room, HSCI-222.

Our New Faculty Member, Dr. Claudia Ojeda-Aristizabal Explains Her Research



From left: Christopher Gonzalez, Christopher Kim,
Dr. Claudia Ojeda-Aristizabal, Joseph Guzman, and David Rosser

"Graphene is the first truly two dimensional crystal observed in nature. Before its discovery in 2004, it was believed that a two dimensional crystal could not exist. This statement was introduced in the 1940's by the famous Physicists Lev Landau and Rudolf Peierls who argued that in a 2D crystal strong thermal fluctuations would destroy long range order. More than sixty years later, a group of experimentalists at the University of Manchester managed to isolate for the first time a one atom thick crystal from its mother compound graphite by using scotch tape! Graphene made its debut in 2004, creating huge excitement in the Condensed Matter Physics community. In 2010, Andre Geim and Kostya Novoselov from the University of Manchester were awarded with a Nobel Prize in Physics for their experiments on graphene.

Since its experimental discovery, this "text book" system has been subject of an extensive number of investigations. Even today, ten thousand papers per year are published showing the different wonders of graphene. What is so special about this material? Graphene opens the door to transparent and flexible electronics. Electrons can travel in graphene for long distances (over one micron) without being scattered. More importantly, electrons behave in graphene as if they were massless relativistic particles, like photons or neutrinos, something never observed before in a solid!

Graphene started the field of layered materials. There are lots of properties to be explored both from the fundamental point of view and for many applications in electronics. In my lab at CSULB, I will study phenomena occurring at the interface of different layered materials like dichalcogenides, topological insulators, organic semiconductors, transition metal oxides, and graphene. These are materials rich with physics, that when combined together can host new phenomena. Can we induce the spin polarization characteristic of topological insulators in a different material? Can we create a superconducting state at the interface between graphene and organic molecules?

Graduate and undergraduate students will explore the world of low dimensional electronics in my lab, using techniques of electronic transport at low temperatures. We will synthetize materials by chemical vapor deposition, and we will experience the wonders of mechanical exfoliation using the famous scotch tape. We will make use of a second technique to complement our

measurements of electronic transport, angle resolved photoemission spectroscopy (ARPES). This powerful technique, based on the photoelectric effect, will allow us to learn about the physics of our heterostructures before building powerful electronic devices in the lab."

Dr. Andreas Bill's Research Group

From left: George Wang, James Brugger, Brendan Chan,
Dr. Andreas Bill, Vladislav Larionov, and Luis Leal

Title: Coexistence of Quantum Electronic Phases in Hybrid Structures

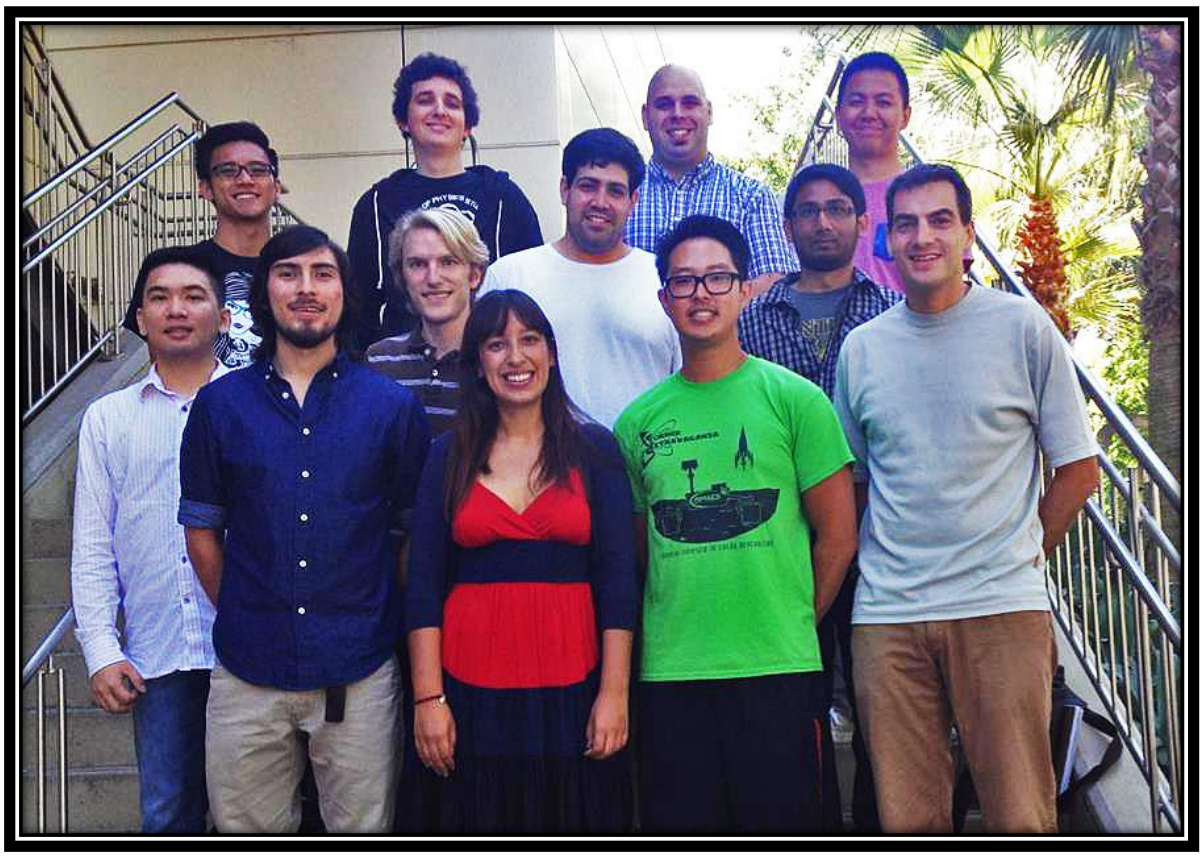
The research activities of our group focus on the study of coexisting phases in solids. The main project of the past year has been the study of electron pair correlations in diffusive hybrid structures made of superconducting and inhomogeneous magnetic thin films placed in close proximity to each other. We have introduced two new fundamental phenomena: the cascade effect and the singlet-triplet 0-pi transition of the Josephson current. These phenomena led to propose experiments where the effect can be observed and contribute to the area of spintronics applications. The results have been published in the New Journal of Physics and Europhysics Letters.

Together with George Wang who is finishing his Master's thesis we have also finished a simulation describing the crystallization of an amorphous thin film. The simulation is used to determine the effective growth rate of grains as a function of the parameters of the system, which is the last missing piece for a self-consistent theory of the random nucleation and growth crystallization process. Finally, we continued working on developing a numerical code to calculate electronic properties of layered materials and graphene multilayers in particular.

Some of the work has been performed during the sabbatical year of Andreas Bill in Madrid Spain. We gratefully acknowledge the support of the National Science Foundation (DMR-1309341).

Dr. Bill is also the Graduate Advisor and Colloquium Coordinator.

Dr. Thomas Gredig's Research Group



Back: Brian Cacha, Matthew Byrne, Nicholas Miller, Quang Dang
Middle: Le Duong, Paul Ekstrand, Francis Doodis, Arith Rajapakse
Front: Kevin Cano, Erika Escobar, Chris Kim, Dr. Thomas Gredig
(Group Photo from Fall 2014)

Our research interest lies in metallo-phthalocyanine thin films. We approach the topic from three angles: 1) thin film morphology and characterization by x-ray diffraction, atomic force microscopy, and optical spectroscopy, 2) charge transport properties including photoconductivity in thin films and multilayers, and 3) magnetic properties of iron and manganese phthalocyanine thin films. Most recently, we reported on a new phase of crystal growth in iron phthalocyanine thin films, see J. Appl. Phys. **117**, 17A735 (2015). Also, we propose a model for the magnetic ground state of iron phthalocyanine thin films, see Phys. Rev. B **91**, 220401 (2015). This year, Brian Cacha will defend his thesis with the title: "Metallic Nanoparticle Deposition Techniqes For Enhanced Organic Photovoltaic Cells", and Paul Ekstrand will publish his thesis under the title "Magnetic Relaxation in Iron Phthalocyanine Thin Films".

We acknowledge the support of the National Science Foundation (DMR-0847552 and DMR-1136621), Scholarly and Creative Activity Committee Award 2014/15 as well as support from Keck Foundation for the Keck Energy Material Research Program (KEMP).

Dr. Jiyeong Gu's Research Group

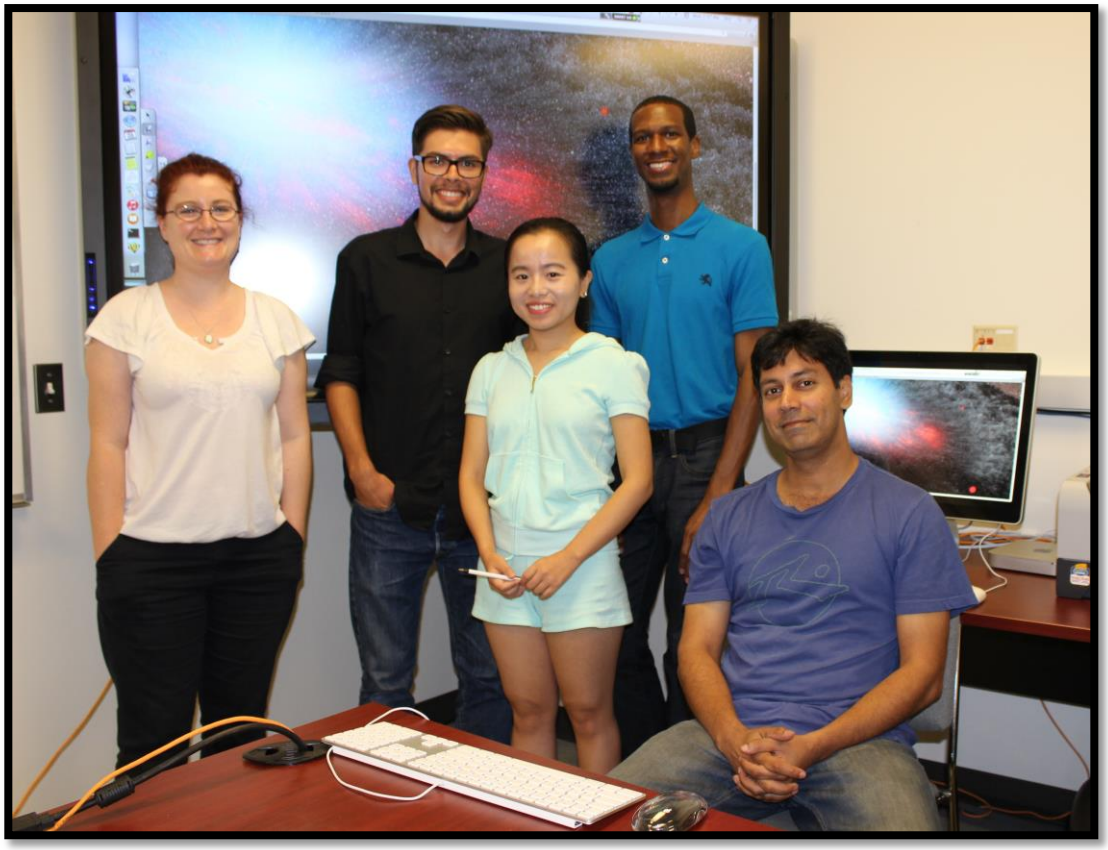
From left: Mikhael Semaan, Daniel (Danny) Kuljis, Kevin Ngo, Dr. Jiyeong Gu, Melynda Jaramillo, Sandra Milena Diez Pinzon, Samuel Hedges, (absent) Gilbert Arias, Jay Conlon

This group picture was taken in October 2014. Gilbert and Jay just joined our research group in Spring 2015. Gilbert will be working on fabrication of Superconductor/Ferromagnet Josephson Junction using nanosphere lithography and Jay will be working on magneto optical ellipticity measurement of ferromagnetic thin films. Welcome to our group! Sam is graduating in summer 2015 and heading to Duke University to start his Ph.D. program. He wants to do the research on experimental neutrino physics. Thanks for all your hard work, Sam! Wish all the best to your future career! Mikhael is doing a 10 week long REU (Research Experiences for Undergraduates) program this summer at University of Toledo, Ohio. He is working in the condensed matter theory/surface physics group. We can't wait to hear about his experience and research at Ohio when he comes back in August. Sandra and Danny are working hard to finish up their master's thesis projects and planning to graduate in Fall 2015. I hope that both can get good results and finish on time. Good luck to the future career after your Master's degree! Kevin and Melynda are trying to obtain uniformly deposited monolayer of nanospheres. With that they plan to fabricate antidot nanostructures. Melynda is focusing on the imaging of nanospheres and antidots using atomic force microscopy. All the members are devoting their summer time to research. This is the way they spend their summer! All their hard work will pay off in the future. I am looking forward to another exciting academic year, 2015-2016.

Dr. Prashanth Jaikumar's Research Group

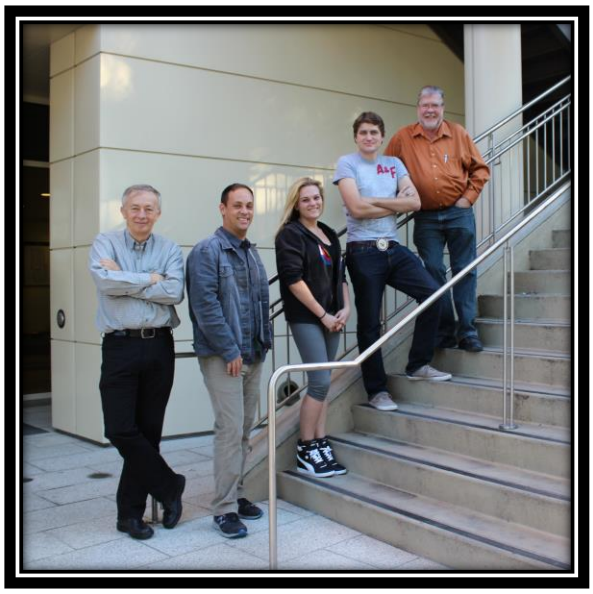
1. Dr. Jaikumar will be going on sabbatical in Fall of 2015 to carry out research at the University of Calgary in Canada. He will be working with his collaborator, Dr. Ouyed, and his group, on their model of the Quark-Nova and nucleosynthesis calculations. They have recently proposed a model to explain the inflated radius of extrasolar Jovian planets through Deuterium fusion in their icy cores, which Dr. Jaikumar has submitted for publication to the Astrophysical Journal.

2. Dr. Jaikumar's group at CSULB currently involves 3 graduate students, Jessica Asbell, Julia Sen and Zack Hall, working on research topics in Astrophysics. Undergraduate students Sabrina Kaplan and Sara Limon also worked with him on research projects funded by the Research Corporation for Science Advancement in Summer 2015. More students are expected to join next year.



From left: Jessica Asbell, Raphael Monroy, Julia Sen, Zack Hall, and Dr. Prashanth Jaikumar

Dr. Zoltan Papp's Research Group



From left: Dr. Zoltan Papp, Samuel Pottish, Natalie Brown, Josh Fernandez, and Dr. Robert Woodhouse

The primary research interest in this group focuses on quantum mechanical few-body problems. Zoltán has developed innovative solution methods for solving few-body equations that have been applied to various problems in atomic, nuclear and particle physics.
There have been a lot of changes among the graduate students:

Khang Nguyen has graduated and is off to a Ph.D. program at the University of Washington,

Natalie Brown is graduating this summer and will attend a Ph.D. program at Georgia Tech University. Her thesis work was to solve multicomponent relativistic equations by using matrix continued fractions. In 2014 she received the 1st place Kennedy Reed award for best theoretical research by a graduate student at the Far West Section of the APS meetings in Reno, Nevada.

Current and new students are:

Sam Pottish who will continue Natalie's work on matrix-continued fractions for solving relativistic quantum mechanical equations. Presently he is looking at the non-quantum version of the multicomponent relativistic quantum mechanical equations.

Mark Linick who is working on a new orbital transfer technique.

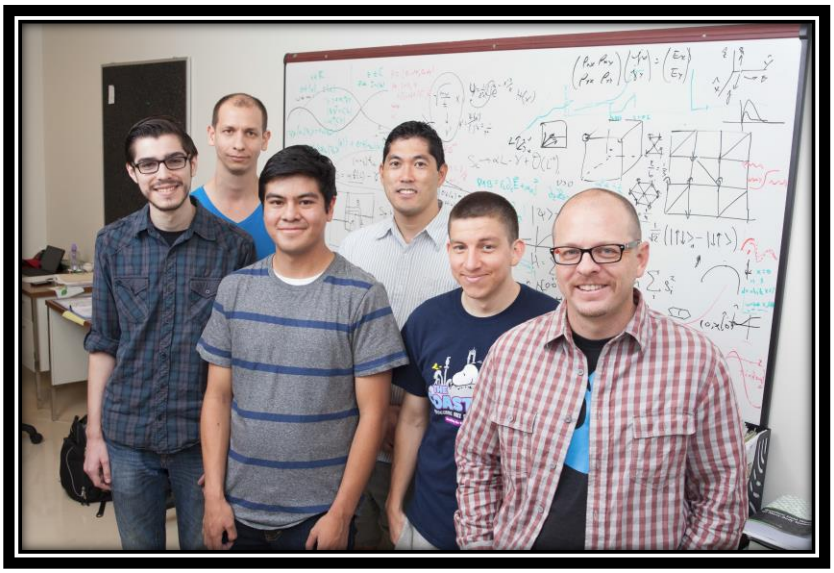
Josh Fernandez who is working on summing up divergent series by continued fractions to solve large matrix eigenvalue problems.

Daniel Diaz who is continuing Khang's work on quark-quark interactions but with a different potential than was previously examined.

Zoltán continues to be involved in developing and implementing computational approaches in undergraduate laboratories. He has also had an undergraduate student, Marena William, working on a Winter Research project "Numerical vPython study of classical mechanical systems with non-hermitian quantum Hamiltonians". She will be continuing her work on this topic during the summer as well and probably be joined by several other undergraduate students that will work under Zoltán's tutelage.

It has been a busy and fun year and Zoltán's group is looking forward to yet another exciting and productive year.

Dr. Michael Peterson's Research Group



From left: Matthew Acosta (now at Ohio State), David Ronquillo (starts at Ohio State F2015), Dan Silva (now at Florida State), Ryan Hashi, Michael Arciniaga (starts at UC Santa Cruz F2015), Dr. Michael Peterson

Numerical Investigations of Topologically Ordered Phases

Our group focuses on strongly correlated quantum systems using mostly numerical techniques like exact diagonalization and quantum Monte Carlo. New exotic phases of matter sometimes emerge due to the strong particle interactions and among the most studied and interesting phases are so-called topologically ordered phases. Topological order is a zero-temperature order corresponding to long range quantum entanglement between the individual particles. The proverbial example of topologically ordered phases are displaying the fractional quantum Hall effect (FQHE), although, other condensed matter systems can show topological order. As the name would suggest, topologically ordered phases are robust to local disturbances (only global changes matter) and have potential applications in fault-tolerant quantum information processing (quantum computing).

One of our main concerns is to figure out how realistic effects inherent in actual experiments affect the physics of these phases. In the last year, we have had four publications. Three involved various studies of the FQHE in semiconductor heterostructures and graphene—we mapped out the phase diagram for the so-called 5/2 non-abelian Pfaffian state (Physical Review X 5, 021004 (2015)) and predicted the possible existence of new exotic states in bilayer quantum wells (Physical Review B 92, 035103 (2015)) and in graphene (Physical Review Letters 113, 086401 (2014)). Last but not least, my student David Ronquillo and I published a "Rapid Communication" (Physical Review B 90, 201108(R) (2014)) identifying a topologically ordered state in an interesting quantum spin model and, in the process, made an important contribution to a long-standing problem.

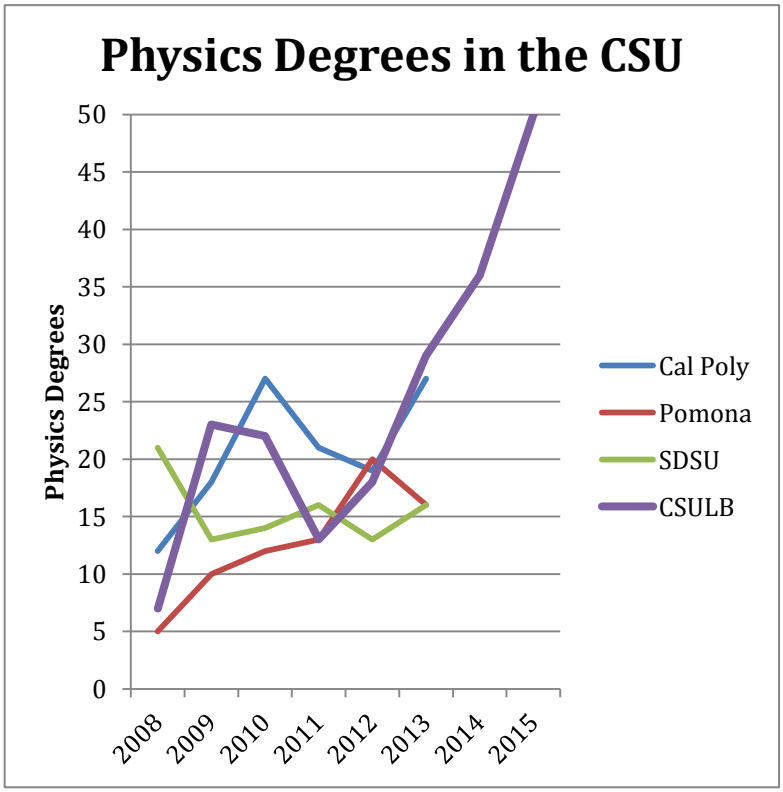
This last year has seen David Ronquillo and Michael Arciniaga both graduate with Master's degrees and they will begin PhD work in the fall at Ohio State University and the University of California Santa Cruz, respectively. Stay tuned for an upcoming manuscript regarding Michael Arciniaga's work. The current group consists of Ronquillo, Arciniaga, Jake McCord, Yonas Getachew, Will Hutzel, Michael Anguiano, and undergraduates Carey Williams and Tyler Salners.
* We thank the CSULB Office of Research and Sponsored Programs, Microsoft Research Station Q, and the W. M. Keck Foundation for support.

Dr. Galen Pickett and the Undergraduate Program

2014-15 Undergraduate Program

Several department initiatives have begun to bear fruit in remarkable ways, both quantitatively and qualitatively, at the close of the 2014-15 academic year. Many of our alumni of the past ten years have been touched by one or more of these projects. For instance, we are in the tenth year of our "Winter Physics Experience" project, in which promising physics majors (and students we feel can be recruited towards physics) are given a couple of weeks to explore the activity in our research laboratories. This winter, we started a short course on vector calculus as a part of the program, intended to support students just before they have to apply these mathematical tools in PHYS 340A and PHYS 350. Additionally, we are just about to begin hiring our fifth class of Learning Assistants. These are physics majors who have shown an interest in teaching, and we put them to work in supporting learning (primarily) in PHYS 151, although they support PHYS 152, 310, 340A, and 350 with advanced, supportive tutoring. The Learning Assistant position is a paid one, and has been funded by the American Physical Society, the Highly Valued Degree Initiative, and by the Julius Sumner Miller Foundation. Just $750 pays for an entire semester's support for a single student, and the entire administrative cost of the program is born by the department – each cent goes to a physics major helping another student … become a physics major!

Our success in recruiting and graduating physics students has been truly astounding. As of 2013 (the last date in which public graduation data is available for our sister CSU campuses) CSU Long Beach became the largest physics program in the system (by degree production) edging Cal Poly by two degrees. We, or course, have data in the 2014 and 2015 graduating classes, and the data show clearly that the growth for which we have planned and prepared has become a very real effect. In 2015, fully 42% of all of the physical sciences undergraduate degrees awarded by CSU Long Beach went to physics students … the 7th largest such fraction in the nation. Upper division courses have enrollments routinely exceeding sixty, which makes CSU Long Beach something like the 40th largest physics program in the US. Each of the larger programs is housed at a major research university dominated by the presence of strong Ph.D. programs and infrastructure. Here at CSU Long Beach, our 11 tenure-track faculty members are producing exciting, cutting edge research with authentic student involvement, and opening up life-changing careers to the excitingly diverse student population we are charged with serving.



PhysTEC Is Filled With Fun and Adventure!

Kevin Dwyer (Teacher-In-Residence),
Dr. Chuhee Kwon (PhysTEC Co-PI),
and Dr. Galen Pickett (PhysTEC Co-PI)

Dr. Laura Henriques, PhysTEC Co-PI from the Science Education Department

After eating submarine sandwiches and chips, and sipping cold soft drinks, the students in PhysTEC learn about how to become great high school teachers. They learn ways to inspire students, and how to teach hands-on experiments and learning activities in a fun and exciting way. Physics teachers from local high schools come to share their new ideas with their creative demonstrations. Being a teacher, you touch the lives of students, and you can give them the strength, self-confidence, and knowledge that will enrich their lives forever.

This activity shows teamwork. The students have to balance a stick as they move it slowly up and down in synchrony.

Kevin Dwyer describes a physTEC demonstration to a group of future physics teachers.

The blanket is absorbing energy so that the water balloons won't pop. Chuhee Kwon enjoyed this activity!

Visit us at: www.physicsatthebeach.com
Join us on the 2nd Thursday of each month!

Physics at The Beach
PhysTEC Open House Spring 2015

The Physics at The Beach Open House attendees included aspiring high school physics teachers, those interested in making physics their career, local high school and community college professors and lecturers, our own faculty, and current graduate and undergraduate students.

PhysTEC Images

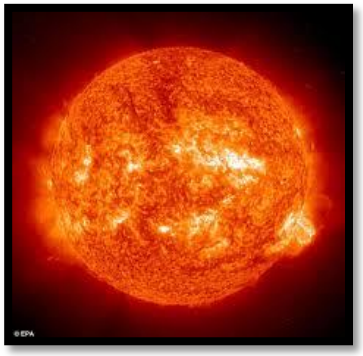
Dr. Chuhee Kwon and future physics instructor Rachael Jordan.

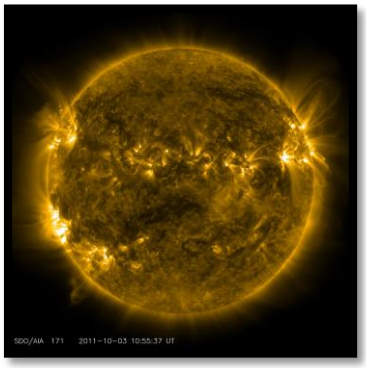
James Lincoln, the AAPT President, is very involved in improving teacher education.

Dr. George Kuck, former physics lecturer, attends almost every PhysTEC meeting.

New Solar Telescopes!

By Michael Frey and Dr. Paul Hintzen





Graduate Student Jessica Asbell
Sets Up a New Solar Telescope

The Physics and Astronomy department at CSULB was awarded a $5000 grant from the Alumni Association that will greatly expand the successful Astronomical Observation program. Currently, only a nighttime activity, our observation activities will expand to daytime solar by using five new solar telescopes.

Hundreds of students each semester use the Astronomical Observation Rooftop Platform. This has proven to be one of the most popular activities, serving the greatest number of students, that the department provides. Now, with the solar telescopes, we hope to engage daytime students with similar observational opportunities. This will enhance our department's outreach to the University community, and will increase our visibility.

The solar telescope is a Colorado Personal Solar Telescope with a slow motion controlled tripod plus eyepieces. These scopes provide a detailed view of the sun using both an intensity filter alongside a Hydrogen-alpha filter to block all colors of light coming from the sun except for the H-alpha line red color. This allows us to see detailed views of solar prominences, sunspots, magnetic heating or cooling surface features and surface boiling granulation. These telescopes provide much more than just brightness filtering views. They provide detailed observations of the active sun.

We plan also to expand the use of our telescopes by providing observationally led lab activities within our Astronomy Laboratory curriculum. In addition, we do plan to add to our open house activities for the campus by adding one daytime open house, which will allow faculty and staff who are not on campus at night to join us.

All in all, this grant will significantly improve our program in the Physics and Astronomy Department. We want to extend a great thank you to the Alumni Association and would love to have any member of that organization join us in our activities!

Student Jessica Joe looks through a telescope as Dr. Paul Hintzen shows her how to adjust the eyepiece.

Graduation 2015

UNIVERSITY/CNSM AWARDS/ACHIEVEMENTS

GRADUATION AWARDS

Robert D. Rhodes Award for the Outstanding Department Baccalaureate Graduate (one per department):

Kayla Bollinger, B.S. Physics

Graduate Dean's List (Top 1% of CNSM graduate students, 4 persons were selected for this year):

Samuel Hedges, M.S. Physics (Prof. Jiyeong Gu)
AND Natalie Brown, M.S. Physics (Prof. Zoltan Papp)

Outstanding Thesis Award:

Mark Lohmann, M.S. Physics (Prof. Prashanth Jaikumar)

Department Honors (noted on the transcript and printed in the College's Commencement Program)**:**

Justin Fournier, B.S. Physics
Christopher Perry, B.S. Physics
Evan Zarate, B.S. Physics

Department Graduate Student Honors (noted on the transcript and printed in the College's Commencement Program)**:**

David Ronquillo, M.S. Physics (Prof. Michael Peterson)
Ashkan Paykar, M.S. Applied Physics (Prof. Gredig/Prof. Shon)
Brian Cacha, M.S. Applied Physics (Prof. Thomas Gredig)

AMERICAN ASSOCIATION OF PHYSICS TEACHERS (AAPT) Outstanding TA and LA
Outstanding TA: Jessica Asbell Outstanding LA: Rachael Jordan

"The American Association of Physics Teacher's is pleased to help you make this a meaningful award by providing a one year membership for your top two teaching assistants in recognition of outstanding performance as a physics educator."

ACHIEVEMENTS AND ACCOMPLISHMENTS

Advanced Degree Programs

Khang Ngyuen: U of Washington, PhD in Physics

Michael Archinaga: UC-Santa Cruz, PhD in Physics

Natalie Brown: Georgia Tech, PhD in Physics

Samuel Hedges: Duke U, PhD in Physics

David Ronquillo: Ohio State U., PhD in Physics

George Wang: U. of New Mexico, PhD in Physics

Ashkan Paykar: U. of Florida, PhD in Physics

Kayla Bollinger: CSULB, MS in Math

Evan Zarate: San Diego State U, MS in Physics

Chris Perry: CSULB, MS in Mechanical Engineering

Summer Research/Internship

Edward Benavidez, UCR MacREU

David Kes, REU, UCLA Computational and Applied Mathematics

Physical Science and Math Scholarship funded by NSF

Jaylen Wimbish

Daan Leiva

Tyrone Thames

Elizabeth Briley

Learning Assistants

Eric Abrego, Dany Atallah, Kayla Bollinger, Lizzie Briley, Kevin Cano, Francis Doody, David Kes, Julio Portillo, Adriana Rincon, Wendy Rivera, (Katy) Maria Wimberly, Sokhom Sim, Samantha Spellman, Travis Thompson, Carey Williams, Jaylen Wimbish, Rachael Jordan

ORSP Summer Student Research Assistantship

Jessica Asbell (Dr. Jaikumar)

Luis Leal (Dr. Bill)

Gilbert Arias & Sam Hedges (Dr. Gu)

Yonas Getachew (Dr. Peterson)

Brandon Kawata (Dr. Kisiel)

Edison Scholars Program

Samanth Crouch

GRADUATION 2015

WELCOME TO THE NEW MEMBERS OF OUR DISTINGUISHED ALUMNI, IN RECOGNITION OF THEIR ACHIEVEMENT IN A DEMANDING MAJOR

BACHELOR's DEGREES

Bachelor of Science:

Kayla Bollinger	Kevin Cano	Francis Doody	Justin Fournier
Leslie Gill	Christopher Gonzalez	Diana Gonzalez	Bryn Horst
Nicholas Jimenez	Rachael Jordan	Christopher Kim	Kenneth Ngo
Marian Nguyen	Christopher Perry	Julio Portillo	Shaina Rawal
Travis Thompson	Maria Wimberly	Evan Zarate	

Bachelor of Art:

Fernando Ayon-Serrato	Joanne Chang	Mahmound Elaraby	Vorleak Him
Michelle Huynh	Danna Monzon	Linh Nguyen	Eric Rowe
Sokhom Sim	Smantha Spellman	Daniel Ta	Cody Tucker
Miguel Vintimilla			

MASTER's DEGREES

Name	Advisor	Thesis Title
Arciniaga, Michael	Peterson	The fractional quantum Hall effect within the lowest Landau level of graphene: towards a more realistic effective Hamiltonian
Brown, Natalie	Papp	Matrix Continued Fraction Solutions to the Relativistic Feshbach-Villars Wave Equations for Spin-Zero Particles
Cacha, Brian	Gredig	Metallic Nanoparticle Deposition Techniques for Enhanced Organic Photovoltaic Cells
Dunlap, Terrence	Abate/Gu	Nanoscale Near-Field Imaging of V02 Phase Transition
Hedges, Samuel	Gu	Odd-Triplet Superconductivity in SmCo/Py Exchange-Spring Based Josephson Junctions
Name	**Advisor**	**Thesis Title**
Kuljis, Daniel	Gu	Incidence angle dependence of Magneto Optical Kerr Effect in magnetic(Py or Co)/nonmagnetic(Nb) multilayers
LeSher, Daniel	Pickett	Analytic Models of Regularly Branched Polymer Brushes Using the Self-Consistent Mean Field Theory
Nguyen, Khang	Papp	Systematic Approach to Optimizing Free Parameters in the Goldstone-Boson-Exchange Model of Quark-Quark Interactions
Paykar, Ashkan	Gredig/Shon	Light-Induced Reshaping of Gold Nanorods Supported by Graphene Oxide
Name	**Advisor**	**Thesis Title**
Kuljis, Daniel	Gu	Incidence angle dependence of Magneto Optical Kerr Effect in magnetic(Py or Co)/nonmagnetic(Nb) multilayers
LeSher, Daniel	Pickett	Analytic Models of Regularly Branched Polymer Brushes Using the Self-Consistent Mean Field Theory

Nguyen, Khang	Papp	Systematic Approach to Optimizing Free Parameters in the Goldstone-Boson-Exchange Model of Quark-Quark Interactions
Paykar, Ashkan	Gredig/Shon	Light-Induced Reshaping of Gold Nanorods Supported by Graphene Oxide
Ronquillo, David	Peterson	Identifying topological order in the Shastry-Sutherland model via entanglement entropy
Wang, George	Bill	Numerical Simulation of the Random Nucleation and Growth Model in Thin Films

SCHOLARSHIPS AY 2015/2016

NAME		Scholarships
William, Marena	BS	Margaret Heeb Summer Research Scholarship
Alvarado, Walter	MS	Margaret Heeb Summer Research Scholarship
Hall, Zack	MS	Philip Ord Johnson Scholarship
Hutzel, William	MS	Philip Ord Johnson Scholarship
Cosue, Carl Matthew	BS	John and Terry Milligan Scholarship in Physics
Kes, David	BS	Richard and Florence Scalettar Scholarship
Atallah, Dany	BS	Richard and Florence Scalettar Scholarship
Rincon, Adriana	BS	Physics Dept Scholarship Fund ($500)
Marin, Juan Mejia	BS	Physics Dept Scholarship Fund ($500)
Diza, Andrew	BS	Physics Dept Scholarship Fund ($500)
Fernandes, Josh	MS	Physics Dept Scholarship Fund ($500)
Rajapakse, Arith	MS	Physics Dept Scholarship Fund ($500)

SPS RECOGNITION:

SPS OFFICERS		
	AY 14/15	AY 15/16
President	Kayla Bollinger	Edward Benavidez
Vice President	Mikhael Semaan	Mikhael Semaan
Secretary	Katy Wimberly	Sara Limon and Marian Nguyen
Treasurer	Diana Gonzalez	Elizabeth Briley
Webmaster	Jaylen Wimbish	Jaylen Wimbish
Social Chairperson	Elizabeth Briley	Edgar Diaz-Rosas
Director of Outreach	Wendy Rivera Chavez	Benjamin Diaz
CNSM Ambassador	Sara Limon	Dion Blackshire
Faculty Advisor	Michael Peterson	Michael Peterson

Professional Career

Julia Meinen: L-3 Communications

The SPS - Society of Physics Students

Edward Benavidez, SPS President

"The Society of Physics Students is committed to the pursuit of excellence in academics and social activities. Our Mission is to have a more social club where our members can relax and have fun while succeeding in physics. We will have movie days, hiking trips to nearby routes, and game nights.

We will also have community outreach opportunities for our members, so we may promote science and physics to students in high school, and middle school. I hope that as president of the SPS, that I can lead our members so that we will accomplish all of our goals during the academic year. "

SPS Club 2015

Drs. Zahur Anwar and Alfred Leung Retire

There was a nice retirement luncheon on Thursday, May 14, 2015 in the CSULB Pacific Room. Drs. Zahur Anwar and Alfred Leung were thanked for their many years of loyal service to the Department and to CSULB. We will miss them, but we are grateful for their many contributions to both teaching and research. Alfred Leung plans to continue studying tai chi and meditation. He is writing a book on tai chi and how it helps you with your daily life. Zahur Anwar plans to visit Argentina and the East European countries that he hasn't been to yet, and he plans to write a book about his travels. He said that his life in retirement can best be described in the words of the Nobel Laureate Indian Poet Rabindranath Tagore, "Clouds come floating into my life, no longer to carry rain or usher storm, but to add color to my sunset sky."

Tony Torres Earns His Forty Year Award!

Physics Issue Room staff member, Tony Torres, earned his forty year award on May 6, 2015. In this photo he is shown with President Jane Close Conoley. He was given a beautiful brass lamp with the CSULB logo and his name on it. He was also given a large, framed award certificate. We congratulate Tony for the many years that he has loyally worked in the Physics Issue Room!

STOP HERE FOR A MOMENT!

You can contribute ONLINE at https://giveto.csulb.edu/?view=PSA

Another way to discuss giving: talk to **Maryanne Horton**, Director of Development of the College of Natural Sciences & Mathematics, at **562-985-1687**.

Thanks very much for any help you can give!
(Don't forget that many corporations will match donations of employees!)

Many students are supported by scholarships. All receive non-state funds that are contributed and are in accounts with the CSULB Foundation. No state funds are used for scholarships or department events.

- **Undergraduate Research Experiences (for Winter Session and Summer)**
- **Scholarships, Colloquia, and General Funds for Department Needs**

GO Beach!

For Our Alumni:
We would like to hear from you!

If you would like to share with us and let us know about your current employment and research, please fill out this survey and e-mail it to irene.howard@csulb.edu or amber.parker@csulb.edu and we will include this information in our next Department newsletter.

Name:

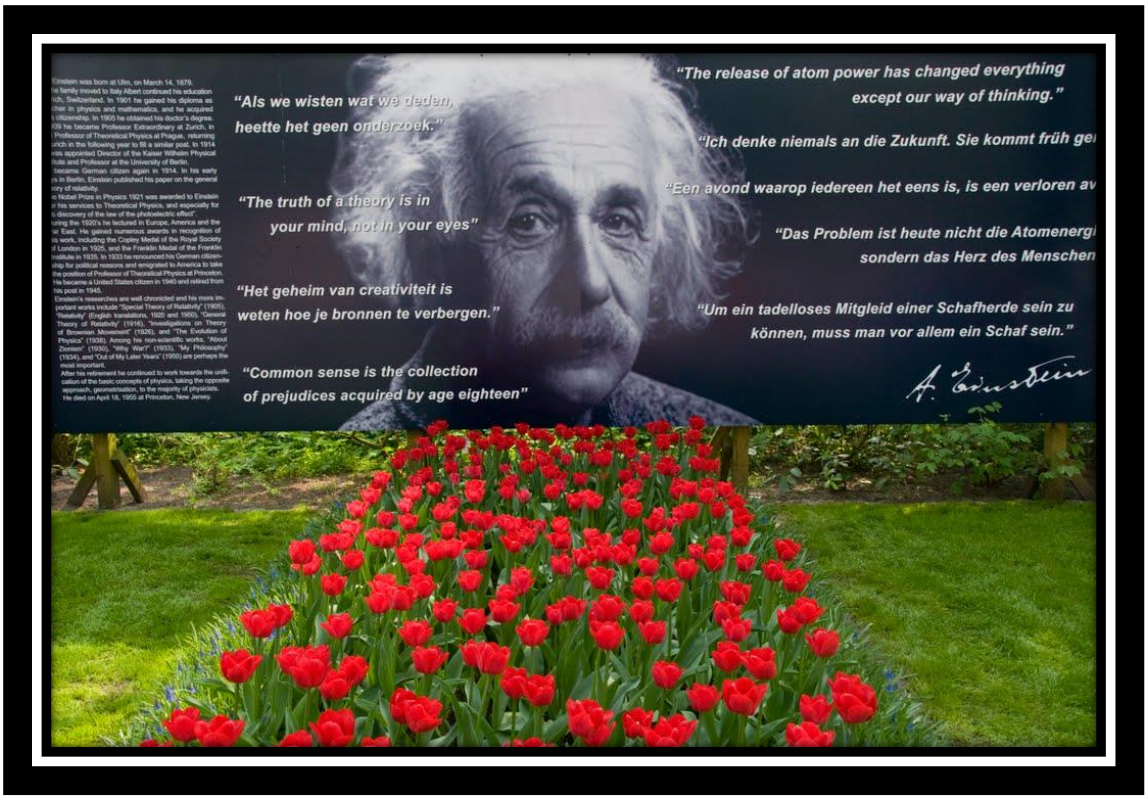
Year of Graduation:

Current Employment:

Areas of Research:

E-Mail Address (optional):

Physics and Astronomy Department Staff (from left) Amber Parker, Mark McLaughlin, Tony Torres, and Irene Howard



"Einstein Celebrated with Flowers"
Photo by Professor Emeritus Dr. Keung Luke